Billing | Service Usage
Order Entry | Service Activation
CRM | Customer Information
Product Catalog | Service Definitions
Trouble Ticket | Service Tickets
NMS | Alarms/ Traps

Web Pages

Portal Server

XML over https

VLAN 1

VLAN 2

Service Delivery Point

Firewall Building

IP Network

Service Provider NOC

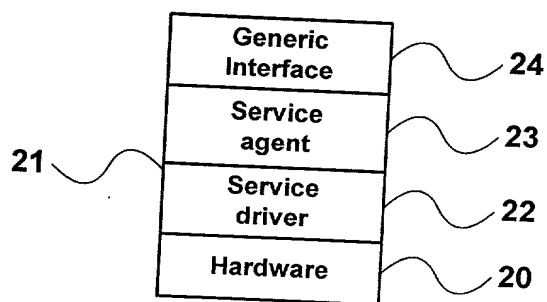Figure 1: Atreus xLINK™ Service Creation Solution Components

Fig. 1

Fig·1

Fig·1

Generic Interface	24
Service agent	23
Service driver	22
Hardware	20

21

FIG. 2

Directory Technology is used to manage Services, Users, and Resources

Fig·3

XML Document: Configuration (1) XML

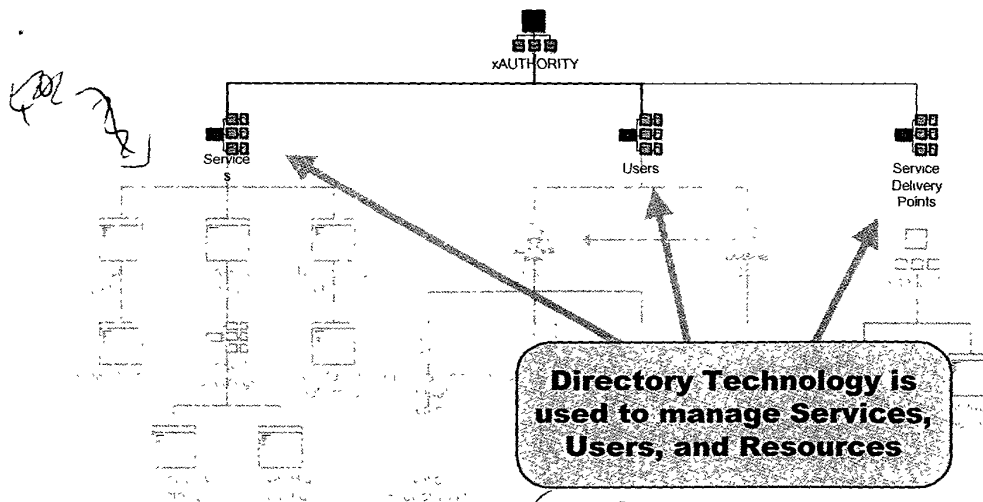<configuration:document xmlns:configuration="http://www.atreus-systems.com/TR/WD-service">

   <rule priority=0 direction="input" default="accept" id="setup(1)">

   <rule priority=0 direction=forward" default="deny" id="setup(1)" >

   <rule priority=0 direction="output" default="accept" masquerade="false" id="setup(1)">

   <rule priority=1 direction="forward" s="64.154 202.227/32" d="0.0.0.0/0" port="any" id="activation(1)">

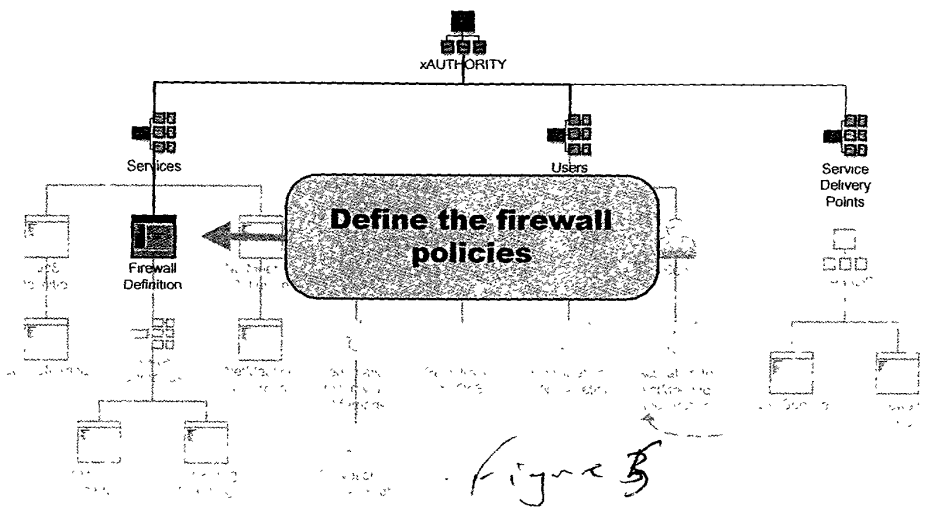</configuration:document>
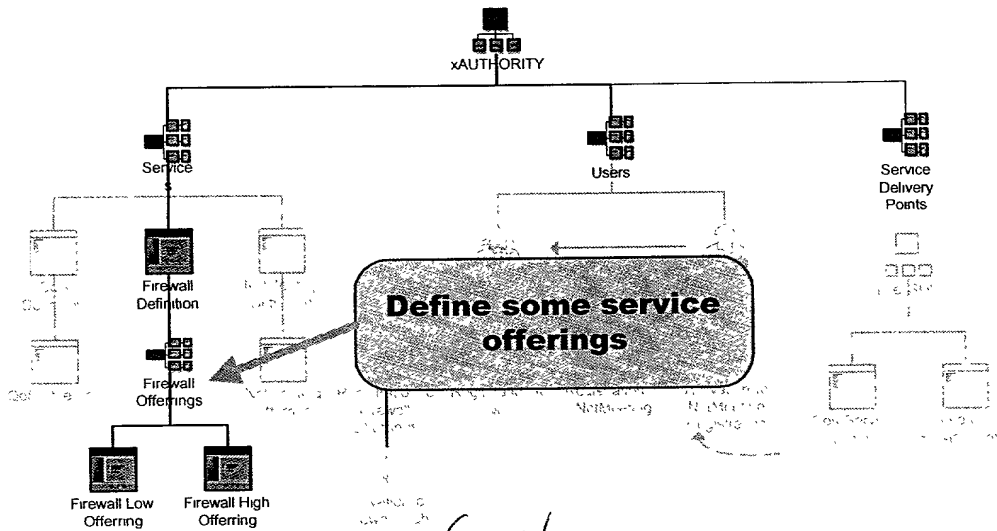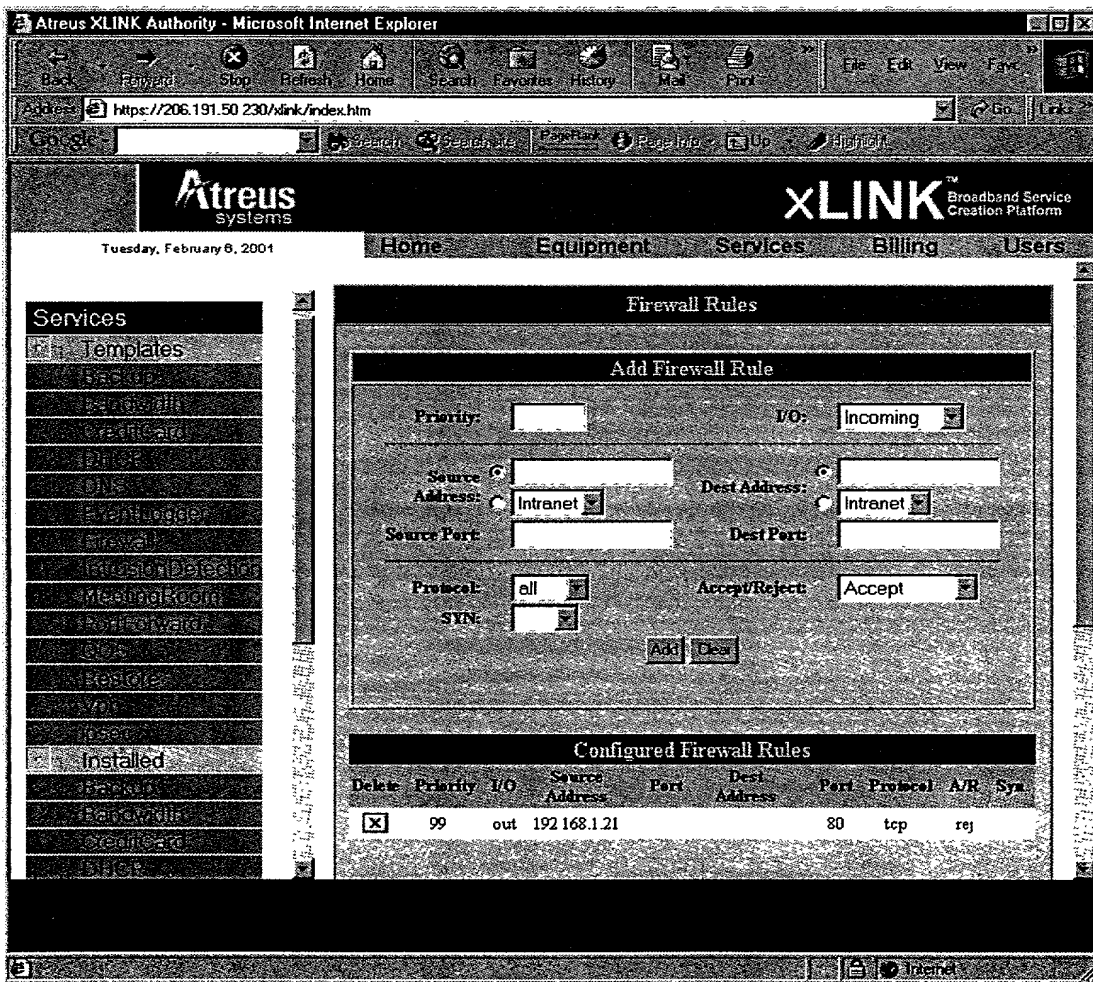
Fig · 4

Define the firewall policies

Fig · 5

xAUTHORITY

Service

Users

Service
Delivery
Points

Firewall
Definition

Define some service offerings

Firewall
Offerings

Firewall Low
Offerring

Firewall High
Offerring

Fig. 6

Fig. 6

Back | Forward | Stop | Refresh | Home | Search | Favorites | History | Mail | Print | File | Edit | View | Fave

Address https://206.191.50.230/xlink/index.htm

Google | Search | Search site | PageRank | Page Info | Up | Highlight

Atreus systems

xLINK Broadband Service Creation Platform

Tuesday, February 6, 2001

Home   Equipment   Services   Billing   Users

Services

Templates
Backup
Bandwidth
Creditcard
DHCP
DNS
Event Logger
Firewall
Intrusion Detection
Meeting Room
Port Forward
QoS
Restore
VPN
Installed
Backup
Bandwidth
Creditcard
DHCP

Firewall Rules

Add Firewall Rule

Priority: [   ]   I/O: [Incoming ▼]

Source Address: ⦿ [   ]   Dest Address: ⦿ [   ]
              ○ [Intranet ▼]   ○ [Intranet ▼]

Source Port: [   ]   Dest Port: [   ]

Protocol: [all ▼]   Accept/Reject: [Accept ▼]
SYN: [▼]

[Add] [Clear]

Configured Firewall Rules

Delete	Priority	I/O	Source Address	Port	Dest Address	Port	Protocol	A/R	Syn
[X]	99	out	192.168.1.21			80	tcp	rej	

Fig 7

Fig 7

Make service offerings available to users

xAUTHORITY

Users

Service Delivery Points

Firewall Definition

Firewall Offerings

Intel

Intel SDP

Registration to Firewall Offerings

Firewall Service Driver

Firewall Low Offering

Firewall High Offering

Fig. 8

Managed Security Service Driver

3rd Party Firewall Platform (PIX, Checkpoint, Shasta)

Service Provider Network

Customer "XYZ" Portal Interface

Customer "ABC" Portal Interface

Customer "123" Portal Interface

via •XML

via •IOS •OPSEC •CORBA
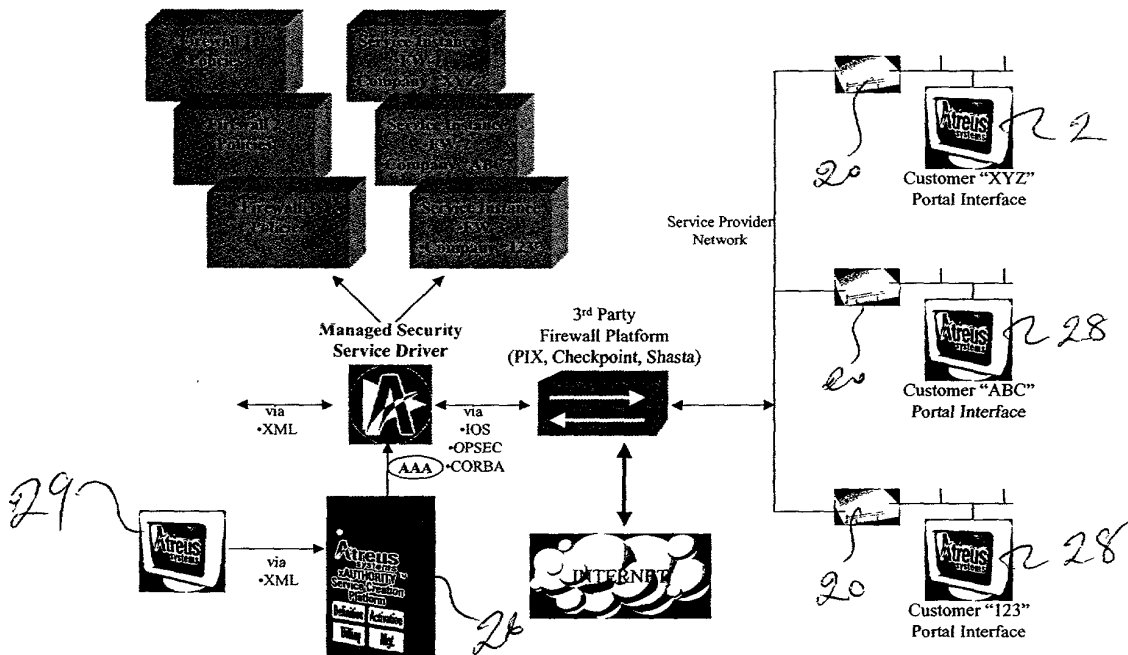
AAA

via •XML

INTERNET

Fig. 9

XML Document: Registration (1)   XML

```
<registration:document xmlns:registration="http://www.atreus-systems.com/TR/WD-service">
  <activation:document xmlns:activation="http://www.atreus-systems.com/TR/WD-service">
  <registration:variable name="address" from="portal">
  <registration:variable name="user" from="portal">
  <registration:variable name="firewall" from="LDAP">
     <rule scope="$user" name="firewall" find="association">
  </registration:variable>
  <registration:variable name="qos" from="LDAP">
     <rule scope="$user" name="qos" find="association">
  </registration:variable>
  <registration:policy name="$firewall" method="activate" id="$self">
     <rule priority=1 direction="forward" s="$subscriber/32" d="0.0.0.0" port="any" .... >
  </registration:policy>
  <registration:policy name="$qos" method="activate" id="$self">
     <rule address="$subscriber" qos= gold">
  < registration:policy>
  <registration:policy name="cn=billing, .. " method="journal" id="$self">
     <rule customer="$user" service="NetMeeting">
  </registration:policy>
  </activation:document>
</registration:document>
```

Fig. 10

Fig. 10

Fig. 11

GUEST ROOM
DSL Modem
ethernet

GUEST ROOM
DSL Modem
ethernet

43

43

26

HOTEL COMMON SPACE

Hotel PMS

Switch — ethernet — Atreus guestLINK — ethernet — CSU/DSU

DATA Network

16

Atreus xLINK Service Creation Platform

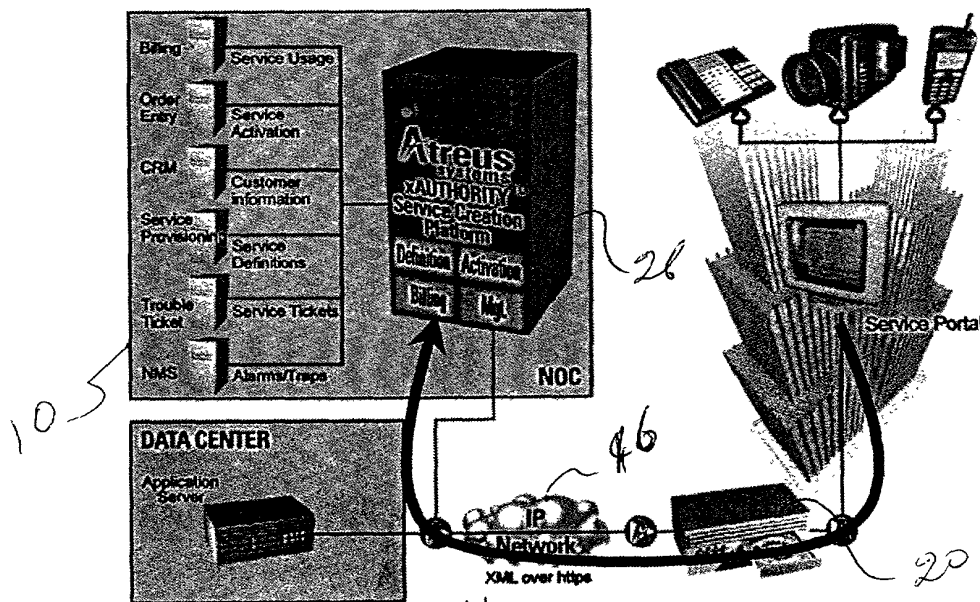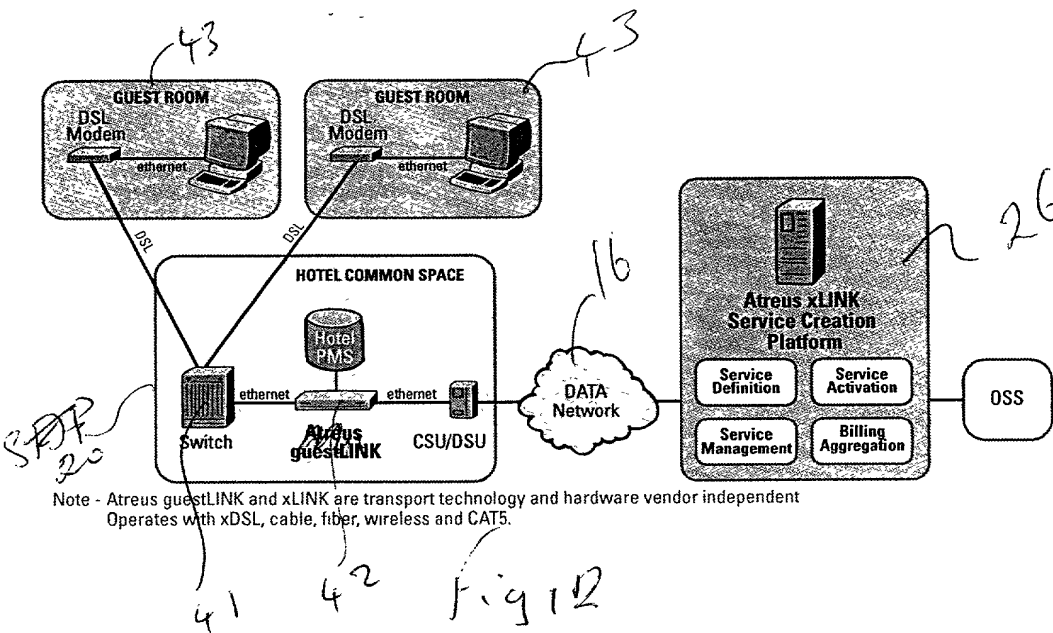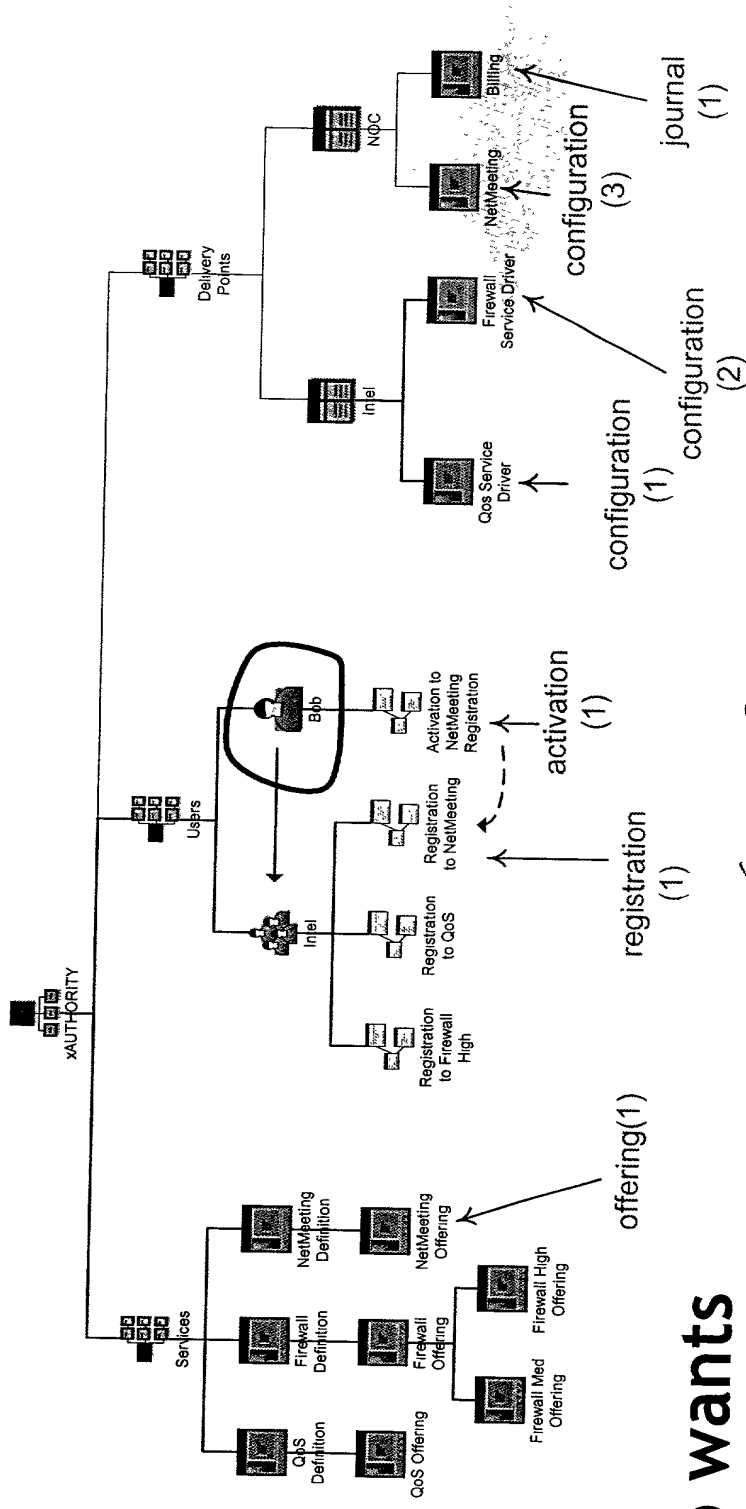| Service Definition | Service Activation |
| Service Management | Billing Aggregation |

OSS

Note - Atreus guestLINK and xLINK are transport technology and hardware vendor independent
Operates with xDSL, cable, fiber, wireless and CAT5.

41

42

Fig 12

Fig.12
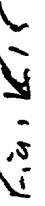
xLINK Directory Tree: NetMeeting Example

Atreus Systems Corp. Confidential

Bob wants to join a NetMeeting!

Fig. 13

Atreus

xLINK Directory Tree: Services

gq

File   Mode   Help

localhost
XL_AMP=AMP
xl_orgUnit=Users,xl_amp=AMP
xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
xl_association=adminGroup,xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
xl_grorgUnit=adminGroup,xl_orgUnit=Users,xl_amp=AMP
xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
xl_association=operatorGroup,xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AMP
xl_association=operator,xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AMP
xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
xl_association=Bob,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
xl_association=HostNetMeeting,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
xl_association=Bob,xl_association=HostNetMeeting,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
xl_association=Intel,xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
xl_association=HostNetMeeting,xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
xl_orgUnit=SDPs,xl_amp=AMP
xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
xl_serviceDriver=QOS,xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
xl_serviceDriver=Firewall,xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
xl_serviceDriver=NetMeeting,xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
xl_orgUnit=Services,xl_amp=AMP
xl_serviceDefinition=QOS,xl_orgUnit=Services,xl_amp=AMP
xl_serviceDefinition=Firewall,xl_orgUnit=Services,xl_amp=AMP
xl_serviceDefinition=NetMeeting,xl_orgUnit=Services,xl_amp=AMP
xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
xl_serviceOffering=HostNetMeetingOffering,xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
xl_association=Intel,xl_serviceOffering=HostNetMeetingOffering,xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP

Fig. 14

Fig. 14

Atreus

xLINK Directory Tree: Users

gq

File Mode

Help

localhost

```
xl_AMP=AMP
  xl_orgUnit=Users,xl_amp=AMP
    xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
      xl_association=adminGroup,xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
    xl_grorgUnit=adminGroup,xl_orgUnit=Users,xl_amp=AMP
    xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
      xl_association=operatorGroup,xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
    xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AMP
      xl_association=operator,xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AMP
    xl_group=intel,xl_orgUnit=Users,xl_amp=AMP
      xl_association=Bob,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
      xl_association=HostNetMeeting,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
        xl_association=Bob,xl_association=HostNetMeeting,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
    xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
      xl_association=intel,xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
      xl_association=HostNetMeeting,xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
  xl_orgUnit=SDPs,xl_amp=AMP
    xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
      xl_serviceDriver=QOS,xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
      xl_serviceDriver=Firewall,xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
    xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
      xl_serviceDriver=NetMeeting,xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
  xl_orgUnit=Services,xl_amp=AMP
    xl_serviceDefinition=QOS,xl_orgUnit=Services,xl_amp=AMP
    xl_serviceDefinition=Firewall,xl_orgUnit=Services,xl_amp=AMP
    xl_serviceDefinition=NetMeeting,xl_orgUnit=Services,xl_amp=AMP
    xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
      xl_serviceOffering=HostNetMeetingOffering,xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
        xl_association=Intel,xl_serviceOffering=HostNetMeetingOffering,xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
```

Fig. 15

Atreus

xLINK Directory Tree: Delivery Points

gq   _ □ ×

File   Mode   Help

```
localhost
  XL_AMP=AMP
    xl_orgUnit=Users,xl_amp=AMP
      xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
      xl_association=adminGroup,xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
      xl_grorgUnit=adminGroup,xl_orgUnit=Users,xl_amp=AMP
      xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
      xl_association=operatorGroup,xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
      xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AMP
      xl_association=operator,xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AMP
      xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
      xl_association=Bob,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
      xl_association=HostNetMeeting,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
      xl_association=HostNetMeeting,xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
      xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
      xl_association=Intel,xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
      xl_association=HostNetMeeting,xl_user=Bob,xl_orgUnit=Users,xl_amp=AMP
    xl_orgUnit=SDPs,xl_amp=AMP
      xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
      xl_serviceDriver=QOS,xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
      xl_serviceDriver=Firewall,xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
      xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
      xl_serviceDriver=NetMeeting,xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
    xl_orgUnit=Services,xl_amp=AMP
      xl_serviceDefinition=QOS,xl_orgUnit=Services,xl_amp=AMP
      xl_serviceDefinition=Firewall,xl_orgUnit=Services,xl_amp=AMP
      xl_serviceDefinition=NetMeeting,xl_orgUnit=Services,xl_amp=AMP
      xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
      xl_serviceOffering=HostNetMeetingOffering,xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
      xl_association=Intel,xl_serviceOffering=HostNetMeetingOffering,xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Services,xl_amp=AMP
```

Fig. 16

Atreus

Define Service Offering

XML Document: offering (1)

```xml
<offering:document xmlns:offering="http://www.atreus-systems.com/TR/WD-service">
<registration:document xmlns:registration="http://www.atreus-systems.com/TR/WD-service">
<activation:document xmlns:activation="http://www.atreus-systems.com/TR/WD-service">
<registration:variable name="address" from="portal"/>
<registration:variable name="user" from="portal"/>
<registration:variable name="firewall" from="LDAP"/>
  <rule scope="$user" name="firewall" find="association"/>
</registration:variable>
<registration:variable name="qos" from="LDAP"/>
  <rule scope="$user" name="qos" find="association"/>
</registration:variable>
<registration:policy name="$firewall" method="activate" id="$self"/>
  <rule priority=1 direction="forward" s="$subscriber/32" d="0.0.0.0" port="any" ..... >
</registration:policy>
<registration:policy name="$qos" method="activate" id="$self"/>
  <rule address="$subscriber" qos="gold"/>
</registration:policy>
<registration:policy name="cn=billing, ... " method="journal" id="$self"/>
  <rule customer="$user" service="NetMeeting"/>
</registration:policy>
</activation:document>
</registration:document>
</offering:document>
```
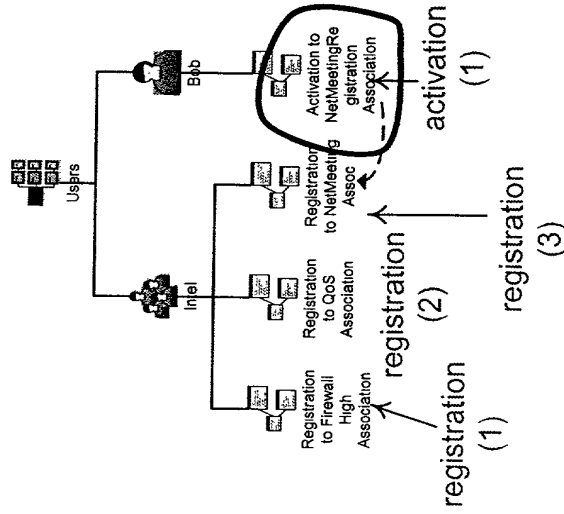
Services

QoS Definition

Firewall Definition

NetMeeting Definition

QoS Offering

Firewall Offering

NetMeeting Offering

Firewall Med Offering

Firewall High Offering

offering(1)

Fig 17

Fig. 17

Atreus

Bob Activates the NetMeeting Service
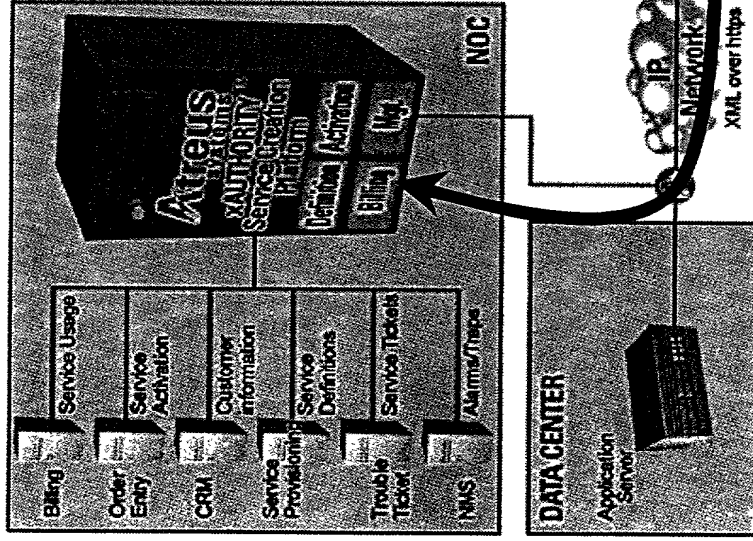

```
<policy name="association=>NetMeeting,..."
    method=activate>
<rule user="cn=Bob, ..."
    password="Aloha"
    address=64.154.202.227>
</policy>
```

Bob's portal sends activation request to xAuthority

Fig. 18

Atreus

Activate NetMeeting Registration Policy

XML Document: Registration (1)

```
<registration:document xmlns:registration="http://www.atreus-systems.com/TR/WD-service">
<activation:document xmlns:activation="http://www.atreus-systems.com/TR/WD-service">
  <registration:variable name="address" from="portal">
  <registration:variable name="user" from="portal">
  <registration:variable name="firewall" from="LDAP">
    <rule scope="$user" name="firewall" find="association">
  </registration:variable>
  <registration:variable name="qos" from="LDAP">
    <rule scope="$user" name="qos" find="association">
  </registration:variable>
  <registration:policy name="$firewall" method="activate" id="$self">
    <rule priority=1 direction="forward" s="$subscriber/32" d="0.0.0.0" port="any" .... >
  </registration:policy>
  <registration:policy name="$qos" method="activate" id="$self">
    <rule address="$subscriber" qos="gold">
  </registration:policy>
  <registration:policy name="cn=billing, ... " method="journal" id="$self">
    <rule customer="$user" service="NetMeeting">
  </registration:policy>
</activation:document>
</registration:document>
```
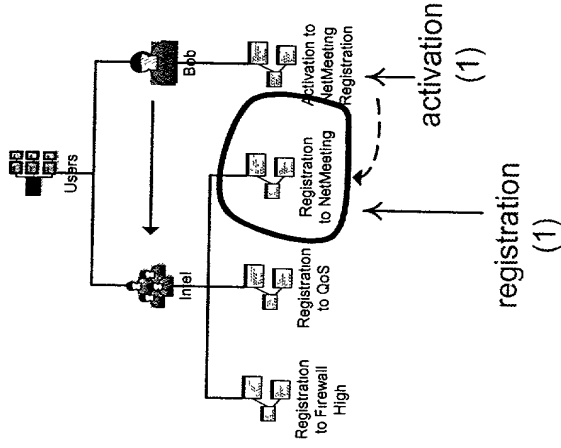
xAuthority uses the registration to complete an activation document for Bob

Fig. 19

Atreus

NetMeeting Activation Policy

XML Document: Activation (1)

```
<activation:document xmlns:activation="http://www.atreus-systems.com/TR/WD-service">

<activation:policy dn="cn=Chicago, ..." method="activate" id="activation(1)">

  <rule priority=1 direction="forward" s="64.154.202.227/32" d="0.0.0.0" port="any" protocol="any">

</activation:policy>

<activation:policy dn="cn=Chicago, ..." method="activate id="activation(1)">

  <rule address="64.154.202.227" qos="gold">

</activation:policy>

<activation:policy name="cn=billing, ..." method="journal" id="activation(1)">

  <rule customer="dn=>cn=Bob,..." service="NetMeeting">

</activation:policy>

</activation:document>
```
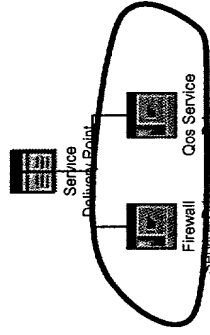
Users

Bob

Intel

Registration
to Firewall
High
Association

registration
(1)

Registration
to QoS
Association

registration
(2)

Registration
to NetMeeting
Assoc

registration
(3)

Activation to
NetMeetingRe
gistration
Association

activation
(1)

xAuthority keeps a record
of Bob's activation policy

Fig. 20

Atreus

Service Driver Configuration

XML Document: Configuration (1)

```
<configuration:document xmlns:configuration="http://www.atreus-systems.com/TR/WD-service">

<rule priority=0 direction="input" default="accept" id="setup(1)">

<rule priority=0 direction=forward" default="deny" id="setup(1)" >

<rule priority=0 direction="output" default="accept" masquerade="false" id="setup(1)">

<rule priority=1 direction="forward" s="64.154.202.227/32" d="0.0.0.0/0" port="any" id="activation(1)">

</configuration:document>
```

XML Document: Configuration (2)

```
<configuration:document xmlns:configuration="http://www.atreus-systems.com/TR/WD-service">

<service qos="gold" cir="1500000" burst="20" id="setup(1)">

<service qos="silver" cir="1000000" burst="20" id="setup(1)">

<service qos="bronze" cir="500000" burst="20" id="setup(1)">

<rule address="64.154.202.227" qos="gold" id="activation(1)">

</configuration:document>
```

Service Delivery Point

Firewall Service Driver

Qos Service Driver

configuration (1)   configuration (2)

Fig. 21

xAuthority maintains a complete service driver activation policy

Fig. 21

Service Driver Configuration

Atreus

File   Mode   Help

xl_serviceDriver=Firewall,xl_bac=Intel,xl_orgUnit=S

localhost
XL_AMP=AMP
  xl_orgUnit=Users,xl_amp=AMP
    xl_user=admin,xl_orgUnit=Users,xl_amp=AMP
      xl_association=adminGroup,xl_user=admin,xl_orgUnit=A
    xl_grorgUnit=adminGroup,xl_orgUnit=Users,xl_amp=A
  xl_user=operator,xl_orgUnit=Users,xl_amp=AMP
    xl_association=operatorGroup,xl_user=operator,xl_
    xl_group=operatorGroup,xl_orgUnit=Users,xl_amp=AI
  xl_user=operator,xl_group=operatorGroup,xl_
  xl_group=Intel,xl_orgUnit=Users,xl_amp=AMP
    xl_association=Bob,xl_group=Intel,xl_orgUnit=Users
    xl_association=HostNetMeeting,xl_group=Intel,xl_o
      xl_user=Bob,xl_orgUnit=Users,xl_association=HostNetMeeti
    xl_association=Intel,xl_user=Bob,xl_orgUnit=Users,x
    xl_association=HostNetMeeting,xl_user=Bob,xl_org
  xl_orgUnit=SDPs,xl_amp=AMP
  xl_bac=Intel,xl_orgUnit=SDPs,xl_amp=AMP
  xl_serviceDriver=QOS,xl_bac=Intel,xl_orgUnit=SDP
  xl_serviceDriver=Firewall,xl_bac=Intel,xl_orgUnit=S
    xl_bac=NOC,xl_orgUnit=SDPs,xl_amp=AMP
    xl_serviceDriver=NetMeeting,xl_bac=NOC,xl_orgU
  xl_orgUnit=Services,xl_amp=AMP
    xl_serviceDefinition=QOS,xl_orgUnit=Services,xl_am
    xl_serviceDefinition=Firewall,xl_orgUnit=Services,xl_
    xl_serviceDefinition=NetMeeting,xl_orgUnit=Services
    xl_serviceDefinition=HostNetMeeting,xl_orgUnit=Serv
    xl_serviceOffering=HostNetMeetingOffering,xl_serv
      xl_association=Intel,xl_serviceOffering=HostNetM

dn	xl_serviceDriver=Firewall,xl_bac=Intel,xl_orgUnit=S
objectclass	top
	xl_serviceDriver
xl_amp	AMP
xl_orgUnit	SDPs
xl_bac	Intel
xl_servicedriver	Firewall
cn	Firewall
release	1.0
description	Firewall Service Driver
module	Firewall.pm
version	1.0
configurl	Firewall.htm
operstatus	up
installstatus	Installed
productcode	undefined
adminstatus	enabled
backupconfiguration	<scottsbackupstuff></scottsbackupstuff>
xmlconfiguration	<FIREWALL_RULE><PRIORITY>1</PRIORITY><S OURCE_ADDRESS>24.42.11.74</SOURCE_ADD RESS><SOURCE_PORT></DEST_ADDRESS>9.9.2 9.9</DEST_ADDRESS><DEST_PORT>123</DES T_PORT><SYN></INCOMING>0</INCOMING><A

Apply   Refresh

Fig. 22